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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/524,358

08/08/2005

Badreddine Bergaya

05-189

6329

34704 7590 09/17/2007
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EXAMINER

HOBAN, MATTHEW E

ART UNIT

PAPER NUMBER

1709

MAIL DATE

DELIVERY MODE

09/17/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/524,358

Applicant(s)

BERGAYA ET AL.

Examiner

Matthew E. Hoban

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/14/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>2/14/05</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Status of Application

Claims 14-36 are pending and presented for examination.

Claims 1-13 are canceled.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 14-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The "aqueous liquid part" is indefinite in composition. This is due to the way in which it is referred in subsequent claims. In claims 17, 18, 21, 22, 23 the liquid part would be inclusive of water. This statement is made in light of the disclosure, where a 100 ml mixture containing 14.7 g dihydrous calcium chloride is made. This translates to a solution having an amount of dihydrous calcium chloride slightly higher than 15% by weight. If the water were not taken as being a part of the "aqueous liquid part" the amount of dihydrous calcium chloride would be over 75% by weight. This problem also pertains to claims 21, 22, and 23

In direct opposition to the meaning of "aqueous liquid part" in the above claims, Claims 31, 32, and 33 bears reference to a liquid part that is not inclusive of water (outside of the H₂O associated with calcium chloride). This is specifically pointed out in

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the specifications, where a sample including 100g of solid is used with 100ml of solution, where the solution contains 14.7g of dihydrous calcium chloride and 3 g water reducing agent and the rest of the solution is water. The disclosure specifically states that the liquid part/solid part mass ratio of this mixture is .18. If the meaning of "liquid part" as denoted in claims 17, 18, 21, 22, 23 was used to compute a mass ratio this ratio would be close to 1, as water would also be included in this ratio. The term "aqueous liquid part" must be given a consistent meaning when various dependant claims bear reference to it. Although there is a definition of this term, this definition is not applied consistently.

3. Claims 17-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The exact form of the calcium chloride is indefinite in these claims. The inclusion of such information is extremely important in calculating the mass and volume percentages of the given components. Calcium chloride comes in several forms, where the best known are anhydrous, dihydrous, tetrahydrous, and hexahydrous. The molar mass and density of these four substances can vary over a wide range. Therefore, the inclusion of the type of chemical is necessary to claim a specific range of calcium chloride content.

4. Claims 31-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims use the language 'volume-to-mass

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ratio between the liquid part and the solid part' and subsequently recite a range of values. It is indefinite whether this range denotes the ratio between the volumes, mass or densities between the two components. The language could also construe a ratio between the volume of the liquid and the mass of the solid. The exact meaning of this phrase is unclear and needs revision in order to specifically claim the material.

5. Claim 36 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim provides for the use of a preparation for producing a material used to restore a mineralized substance, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

6. Claim 36 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 14, 16, 17, and 35 rejected under 35 U.S.C. 102(b) as being unpatentable over ' US 2901377 A (thus forth referred to as '377). '377 uses a means by which Portland cement and a filler, where calcite (**calcium carbonate**) is specifically mentioned as an appropriate filler material (column 5, lines 34-50). Portland cement is a powdered material containing a substantial amount of **both tricalcium silicate and dicalcium silicate** (Relevant to Claim 14). According to NIST (<https://srmors.nist.gov/tables/113-2.htm>) the amount of these two materials in summation is between 80.9 and 84%. '377 goes on to state that the ratio between filler and Portland cement is 20:80 parts by mass. These two materials comprise what would be deemed as the solid part of the preparation in the manufacture of the invention of '377. To this an aqueous liquid part is added being a **3% aqueous solution of calcium chloride** (Relevant to Claims 14, 17 of the instant application) (column 4, lines 17-20). It is explicitly stated that a plasticizer may be added to the mixture as desired (column 2, lines 14-15). The aqueous liquid part and solid part are then "thoroughly mixed"

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(column 4, lines 17-20). The use of thorough mixing is obviously used to ensure a homogeneous solution, if a heterogeneous solution were desired in '377, mixing would not be used. Furthermore, nowhere in the specifications is zirconia or zirconium oxide mentioned (Relevant to claim 16). The phrases "used to restore a mineralized substance" and "for restoring a minseralised (sic) substance in the dental field" are deemed as intended uses for the material and therefore do not differentiate the invention of the instant application from the invention of '377.

9. Claims 14, 16, 19, 20, 24-26, 29-32 rejected under 35 U.S.C. 102 (e) as being unpatentable over US 2003/0127026, which is now US 6,858,074 (will thus forth be referred to as '074). This document discloses the composition of a high early strength cementitious that contains a hydraulic cement (Portland), a high range water reducing dispersant, an accelerator (see abstract), and the optional use of aggregate material such as calcite (column 14, lines 8-17). '074 specifically mentions the use of a modified polycarboxylate as a water reducing dispersant (see top of column 3 and column 8, lines 55-60) and the use of an alkali earth halide as an accelerator (calcium chloride) (see column 12, lines 19-35). Both the dispersant and accelerator are able to be comprised in the solids with the Portland cement or the aqueous medium in which the Portland cement will be mixed. The basis for this observation arises from the fact that these components are described in solution, but these solutions have discreet percentages of solid phase. Furthermore, the percentage of these materials is given in relation to the total of all solid materials. It is stated that the percentages of

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polycarboxylate in the dry material is about .027% to .68% and the amount of accelerator (calcium chloride) is about .018% and 2.03% (see claim 27). The water/cement ratio (volume to mass ratio) of the invention of '074 is recited to be between .25 and .4 (see column 16, lines 57-65). The disclosure of this invention shows no mention or intention of using zirconia. The phrases "used to restore a mineralized substance" and "for restoring a minseralised (sic) substance in the dental field" are deemed as intended uses for the material and therefore do not differentiate the invention of the instant application from the invention of '074.

10. Claims 14-16, 31-33 are rejected under 35 U.S.C. 102(b) as being unpatentable over US 5,584,926 (thus forth referred to as '926). This application discloses a composition of concrete made from 50% to 97% Portland cement and from 3% to 50% extender, where the first example of an extender explicitly mentioned is calcium carbonate (see Abstract). Given Portland cement's content of between 80-84% calcium silicates, this results in between 48 and 80% of the composition being calcium silicates, where the other ~10% of the composition attributed to the Portland cement is aluminosilicates and other additives. Between 5 and 35% of extender is also added, where as it was stated above this extender or aggregate could be calcite (column 5, lines 5-14). To this solid, are added "one or more further components selected from any of the commonly used or well known cement paste, mortar or concrete additives or mixing materials used in cement technology." The patent then goes on to give superplasticizing agents and accelerators as two of these possibilities. Napthalene

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sulfonic acid and naphthalene sulfonic formaldehyde condensates as well as polyhydroxycarboxylic acid and salts thereof are explicitly mentioned as types of plasticizing agents. Chloride salts (such as calcium chloride) are also mentioned as being good accelerators. These two components are mentioned as components that can be concrete additives or mixing materials, so they could be added with the solid or liquid phase in the mixing process. The disclosure states that the liquid/solid (water/cement) ratio in the mixture is anywhere from .15 to 1.0 (see column 9, lines 36-39). The disclosure of this invention shows no mention or intention of using zirconia. The phrases "used to restore a mineralized substance" and "for restoring a minseralised (sic) substance in the dental field" are deemed as intended uses for the material and therefore do not differentiate the invention of the instant application from the invention of '926.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 17-18, 21-23, 27-28 rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0127026, which is now US 6,858,074 (will thus forth be referred to as '074).

The current application claims a preparation including:

1. An aqueous liquid part comprising both calcium chloride and a water reducing agent, in the form of a modified carboxylate, in varying degrees of molarity
2. A solid part including calcium carbonate and at least one silicate selected from tricalcium silicate and dicalcium silicate
3. The solid part and the liquid part are mixed in order to obtain said material

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'074 discloses a method where:

1. An aqueous liquid part made substantially of water
2. A solid part including calcium carbonate (calcite) tricalcium silicate and dicalcium silicate (Portland cement), calcium chloride, and a water reducing agent (water reducing dispersant), where this agent is modified carboxylate. It is stated that the percentages of polycarboxylate in the dry material is about .027% to .68% and the amount of accelerator (calcium chloride) is about .018% and 2.03% (see claim 27).
3. A cement is made by mixing the solid and liquid part

The difference between the instant claims and the disclosure of '074 is the fact that the calcium chloride and water reducing agent of '074 are included in the solid part of the solution rather than the aqueous part. The phrases "used to restore a mineralized substance" and "for restoring a minseralised (sic) substance in the dental field" are deemed as intended uses for the material and therefore do not differentiate the invention of the instant application from the invention of '074.

Anyone of ordinary skill in the art, having a rudimentary knowledge or chemistry would realize that both of these chemicals are water-soluble, and incorporating them into the liquid phase rather than the solid phase or the precursors would require no particular burden. Claims 19-20 and 24-26 of the instant application disclose a situation where the invention is claimed exactly as that of '074. It is regarded that the mass of the

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chemicals that were added to the aqueous solution as in claims 17-18, 21-23 is the same mass as would be added to the solid part of the invention in claims 19-20 and 24-26. Therefore it is obvious to add these components to either the solid or liquid phase of the invention.

There is a motivation to alter the invention in this way, as it is sometimes easier to prepare a solution of accelerators, to avoid the reaction of the solid particles in humid air. If this is not done, concrete can harden before its application.

4. Claim 34 rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,584,926 in view of Bentz et al.

The current application claims a preparation including:

- a. An aqueous liquid part
- b. A solid part including calcium carbonate and at least one silicate selected from tricalcium silicate and dicalcium silicate, where 90% of the particles are smaller than 10 micrometers
- c. both calcium chloride and a water reducing agent in either part
- d. The solid part and the liquid part are mixed in order to obtain said material

US '926's teaching is mentioned in previous 102 rejection (supra), see pg. 7.
US '926 discloses a method where:

- a. An aqueous liquid part

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- b. A solid part including calcium carbonate and at least one silicate selected from tricalcium silicate and dicalcium silicate, where the calcium carbonate has a median particle size of 3 micrometers (see column 5, line 4)
- c. both calcium chloride and a water reducing agent in either part
- d. The solid part and the liquid part are mixed in order to obtain said material

The difference between these two inventions is the fact that the particle size of tricalcium silicate and dicalcium silicate are not disclosed in '926. However, it is common practice in the cement field to minimize the particle size. The disclosure speaks of ultra dense materials (column 9, lines 36-41). In order to make these void space would have to be reduced necessitating small particle size in the Portland cement. Furthermore, smaller particle sizes also reduce the time needed for reaction. This is of extreme importance in new concretes such as this one, where strength is necessary after a relatively short period of time, as roads using the cements cannot be shut down for days or weeks at a time. The phrases "used to restore a mineralized substance" and "for restoring a minseralised (sic) substance in the dental field" are deemed as intended uses for the material and therefore do not differentiate the invention of the instant application from the invention of '926.

The use of small particle sizes below 10micrometers would be well within the skill of one in the art. The effects of smaller particle size are well known in the technology. This

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can be found in many publications such as in D.P. Bentz, E.J. Garboczi, C.J. Haecker and O.M. Jensen, Cement and Concrete Research, Vol. 29 (10), 1663-1671, 1999.

The motivation for this alteration would arise from the kinetics of the reaction as understood generally in chemistry and materials science.

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In retrospect, all claims are rejected.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 272-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VICKIE Y. KIM
SUPERVISORY PATENT EXAMINER

